

ICS-NH

Industrial Consulting & Sales

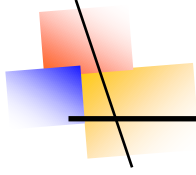
SPS Series Pressure Sensor with Ultra-Wide Temperature Range

SOI (Silicon in Insulator) technology with MEMS technology to effectively solve the current leakage problem of CMOS silicon sensors in high temperature conditions, inheriting the 3D etching structure of MD series chip of a previous generation, and its super high overpressure performance and high stability. The unique PVD technique helps the sensor chip reserve excellent static pressure characteristics and long-term stability in high temperature conditions, so that the sensor chip fully meets military class pressure and differential pressure measurement requirements.

Features:

- SPS series of polysilicon chips use highly pure Monocrystalline silicon material, which is better than common composite silicon and diffusion silicon material on the market. Therefore SPS gives us a world-leading sensor
- Ultra-Wide Operating Temperature
The SPS series silicon chips are manufactured with a dual beam structure and Double Wheatstone Bridge Circuit Principle. The double bridge structure mutually compensates to improve the signal noise ratio and achieve the best temperature characteristics. The middle layer arc angle suspension effectively decompose stress to achieve super high overpressure
- There are five standard measuring ranges:
10kPa, 40kPa, 400kPa, 4MPa, 40MPa
- Excellent overpressure performance SPS series silicon chips have superior overpressure capability:
10kPa chip overpressure up to 3MPa (250 times)
40kPa chip overpressure up to 4.5MPa (100 times)
Most of the differential pressure applications can achieve without middle protected diaphragm, improving the accuracy and static pressure characteristics, simplifying the sensor structure and helping users to reduce costs.
- Polysilicon thickness of chips is as much as 2.5mm
In the silicon chip technology, the size of silicon wafers and the thickness of the effective silicon layer will play a key role in the cost and performance of the single chip. The unique sensor chip material will help to achieve the temperature characteristics so that the stress characteristics of the chip will remain the same when the temperature changes.
SPS series silicon chips are manufactured with monocrystalline silicon material.
- “Image mirroring” MEMS layout





ICS-NH

Industrial Consulting & Sales

Wheatstone bridge circuit principle and lead layout of chips use image mirroring layout. Fully symmetrical layout and balanced force not only reduces the noise source but also improves stability and consistency.

- **High performance parameters:**

Static pressure effects: <0.05% FS/10MPa

Sensitivity: 5-15mV/V

Long-term stability: 0.02%/100%FS/year

Operating temperature: -196 – 350°C

- The best electric resistance performance of bridge circuit: 10kΩ

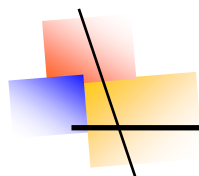
The world's unique bridge circuit resistance: 10kΩ effectively controls the effects of temperature and static pressure, ensuring the ultra-high signal noise ratio of output signal and the lowest possible power consumption.

Specifications:

Range and output:

Sensor chip	Range	Full scale voltage (mV, at 5V)
SPS2	10kPa	60
SPS3	40kPa	80
SPS4	400kPa	100
SPS5	4MPa	150
SPS6	40MPa	125





ICS-NH

Industrial Consulting & Sales

Characteristic parameters:

Parameters	min	Typ.	max	unit
Bridge resistance	8	10	11	k Ω
Offset voltage	-5	2	+5	mV/V
Supply voltage	-	3	10	V
Supply current	-	0.3	1	mA
Resistance coefficient of bridge resistance	+0.05	+0.08	+0.12	%FS/K
Zero temperature coefficient	-0.05	\pm 0.03	+0.05	%FS/K
Full temperature coefficient	-0.05	-0.08	-0.15	%FS/K
Temperature zero hysteresis (42h) (30°C - 135°C - 30°C)	-5	\pm 2	5	μ V/V
Static pressure characteristics	-	\leq 0.05	-	\pm %FS/10MPa
Long – term stability (1000h, 135°C)	-	\leq 5	\pm 20	μ V/V
Non-linear	-	\leq 1	-	\pm %FS
Sensitivity	5	15	20	mV/V

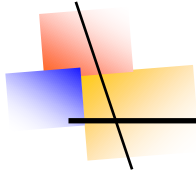
Working pressure (static pressure):

Sensor chip	Range	Overpressure (back side)	Overpressure (front side)
SPS2	10kPa	2MPa	3MPa
SPS3	40kPa	3.5MPa	4.5MPa
SPS4	400kPa	8MPa	10MPa
SPS5	4MPa	10MPa	12MPa
SPS6	40MPa	-	60MPa

Power supply:

ICS-NH • Norbert Heinrich • Wolfener Straße 32-34, Gebäude D 02.040 • 12681 Berlin
 Phone: +49 30 80408666 • Fax: +49 30 80408668 • Cell: +49 1727403718 • E-Mail: info@ics-nh.de
 Bankverbindung: IBAN: DE65100900007025795002 • BIC: BEVODE33
 St.-Nummer 31/337/00253 Finanzamt Berlin (Friedrichshain – Kreuzberg) • USt-Nr.: DE258546892
 Status: 12/2019





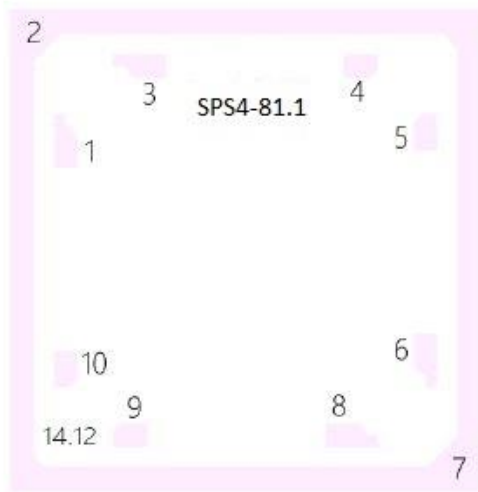
ICS-NH

Industrial Consulting & Sales

Constant voltage power supply: 3 - 20V

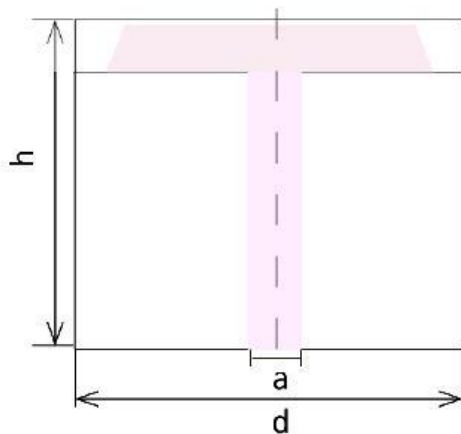
Recommended voltage: 4.5 – 5.5V

Wiring diagram:



SN	Electrical connections
2	V + Power supply +
4	V + Power supply +
5	V - Power supply -
9	S - Signal output -
10	S + Signal output +

Dimensional drawings:



Sensor chip	SPS2	SPS3	SPS4	SPS5	SPS6
d(mm)	3.40	2.50	2.00	1.75	1.75
h(mm)	2.45	2.45	2.45	2.45	2.45
a(mm)	0.50	0.50	0.50	0.50	0.50

